



# LABORATORY OPERATIONS

*R*esponsible stewardship of the Laboratory entails setting and meeting high standards in all aspects of operations. Safe, secure, and efficient operations are an integral part of Livermore's research and development programs. Together, quality operations and scientific and technical excellence make possible Livermore's programmatic accomplishments and sustain public trust in the Laboratory.

Safety and security are the most important considerations in day-to-day operations. The Laboratory provides employees and neighboring communities with a safe and healthy environment in which to work and live. A personal commitment by all employees to the safety of their work—and of the individuals around them—is indicative of a deeply rooted safety culture. The Laboratory is continually improving systems in place to ensure that proper safety practices are learned and followed by all. Security, also the responsibility of every employee, requires vigilance. Nuclear materials, sensitive information, and other valuable assets must be protected against new and evolving threats.

Business processes and systems, infrastructure management, and administrative functions are continually being improved to achieve best-in-class performance among high-technology research organizations. The demand is greater than ever before to improve efficiency and cut costs while also maintaining compliance in an increasingly complex regulatory environment. Contract performance measures help to gauge operational effectiveness and provide quality assurance to Laboratory and contract managers, government officials, and the general public.

## Safety is Paramount

Livermore's Integrated Safety Management (ISM) system provides a framework through which safety procedures and practices are continually improved. A focus on safety by each individual, sound implementation of ISM, and a commitment at all levels of management are critical to success. First on the Laboratory Director's A List for 2006 is "Make a personal commitment to our collective safety and security," and Director George Miller stresses this theme in all of his Laboratory-wide talks to employees.

Injury and illness rates are stable after a decade-long decline that brought the statistics to more desirable levels. For 2006, the rate for recordable cases (number of cases per 100 employee-years) was 2.37, while the rate for cases with days away, restrictions, or job transfers was 1.04. The Laboratory is committed to reducing injury and illness rates. Excellence in safety is exemplified by the National Ignition Facility (NIF) Programs Directorate. In 2006, both the

NIF project site and NIF laboratories received "Perfect Record" awards from the National Safety Council for working more than 12 consecutive months without injury or illness involving days away from work. The Council also awarded NIF Programs a "1 Million Work Hours" award for working 1 million hours without an injury or illness that resulted in days away from work.

The institution and each of the directorates continue to improve their ability to identify their own weaknesses, analyze safety implementation, and take effective corrective actions. Line managers conduct observations of work-level activities for the ISM self-assessment process, and each directorate certifies ISM implementation annually. Areas for improvement are identified and addressed. Livermore has improved the management of corrective action plans to deal with deficiencies. The overall on-time completion rate is high and has dramatically improved over the last year for nuclear-related institutional corrective actions—from 43 percent to 84 percent.

In June, the Laboratory completed the Compliance Management Plan for the Safety Basis Requirements (10CFR830, Subpart B) for its Category 2 and 3 nuclear facilities. All milestones were met to achieve compliance with 10CFR830, Subpart B. This is the culmination of a five-year effort reflecting the development, submittal, and approval of seven 10CFR830-compliant Documented Safety Analyses. Through corrective action plans and process improvements, Livermore is taking vigorous steps to improve safety in all areas to move to a self-identifying, self-correcting program.

The Laboratory has also established a robust emergency management program to ensure that employees and the public are protected from potential consequences of an incident involving hazardous materials. In fiscal year 2006, Livermore met all deliverables in its Emergency Readiness Plan for the National Nuclear Security Administration (NNSA) Livermore Site Office. Emergency Preparedness Hazard Assessment reviews were completed for appropriate facilities,



Ed Moses (left), associate director for NIF Programs, celebrates the directorate's "Perfect Record" award from the National Safety Council with the Materials Storage and Handling team.



Livermore staff worked together with the Livermore Police Department on the SecurEX 07 emergency preparedness drill.

and the Laboratory significantly increased the number and quality of its emergency drills and exercises. Altogether during the year, 26 drills, one annual exercise, and one Department of Energy (DOE) Headquarters-sponsored “no-notice” exercise were held. These efforts have greatly improved how staff work with emergency responders and how access is controlled to an emergency response area.

## Security Improvements

Security was enhanced after the September 11 attacks, and the Laboratory now operates routinely at a heightened security level. An extensive security infrastructure is in place. However, in fiscal year 2006, the Laboratory faced a declining budget for safeguards and security together with increasing requirements and ever-growing threats. Nevertheless, Livermore was able to meet the challenge through continuous improvement of its Integrated Safeguards and Security Management (ISSM) system and judicious application of risk management principles to optimize security investments and scale back some services. The LLNL Site Safeguards and Security Plan was approved by the Livermore Site Office and described by the NNSA Associate Administrator for Defense Nuclear Security (NA-70) as “well done.”

Effective implementation of ISSM helps to ensure that security is a top priority for all employees. Individual and collective responsibilities for safeguards and security are made clear to Laboratory personnel in annual training. Line management is accountable for performance, and each directorate conducts an annual self-assessment—this year focusing on security incident prevention, cyber security, and selected other topics that present risk to the directorate.

Technology investments in 2006 included new physical protection systems, the incorporation of security features in the design of new information technology systems, and an extensive upgrade of the central alarm station. The station serves as the central nervous system for Protective Force operations, including alarm monitoring and site video surveillance.

Livermore is also making continual improvements in cyber security, including extensive cyber security

training, inventory and reduction of Classified Removable Electronic Media (CREM), and the Diskless Conversion Project to eliminate local system disks from classified workstations. Immediately after a widely publicized security incident at Los Alamos National Laboratory, Director George Miller launched a thorough self-assessment of compliance with DOE/NNSA orders and directives, Laboratory policies, and each directorate’s procedures for implementing classified cyber security. He also tasked all employees who deal with classified materials to review cyber security training information as well as security plans and procedures. In addition, the Laboratory is studying several options for further improving its cyber security posture.

## Responsible Environmental Management

In 2006, the Laboratory completed the last of 87 milestones in the Livermore Site Remedial Action Implementation Plan. This completes “build out” of the regulatory-required infrastructure needed to clean up groundwater, which was contaminated with volatile organic compounds (VOCs) by activities in the 1940s, before the Laboratory was established. Since remediation began in 1989, more than 3 billion gallons of groundwater and 225 million cubic feet of soil vapor have been treated, removing a combined total of over 2,200 kilograms of VOCs. The established network of extraction wells and treatment systems is confining the plumes of contaminated groundwater within Laboratory boundaries, and these systems are attacking source area contamination using available technology.

At Site 300, the Laboratory’s remote experimental test site, 20 groundwater and soil vapor-treatment facilities are being operated, and work is under way

## 20 Years of SAFE

In February 1986, Livermore launched the Security Awareness for Employees (SAFE) program, and for 20 years SAFE has been identifying and countering foreign intelligence threats against the Laboratory and its employees. SAFE is widely acknowledged as the model counterintelligence program for DOE. Employee awareness is key to an effective counterintelligence program, and SAFE provides help to staff in dealing with foreign contacts and protecting information. The program also sustains employee awareness of security threats by bringing in speakers from the intelligence and counterintelligence communities—even former KGB officers.



to complete construction of other new facilities. Considerable effort is being devoted to preparation of documents to meet Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) requirements as part of

the process to evaluate and establish remediation needs. Livermore is working closely with all stakeholders to negotiate effective and cost-efficient remedies that will protect human health and the environment from unacceptable risk.

Laboratory meteorologist Brent Bowen (left) and Gary Bear monitor weather at the 52-meter meteorological tower. Meteorological data support emergency preparedness and response, regulatory atmospheric modeling, and essential environmental sampling.



In fiscal year 2006, Livermore also declared conformance with International Standard ISO 14001, Environmental Management System (EMS), after ISO 14001 requirements were effectively integrated into the Laboratory's ISM system. EMS promotes responsible environmental stewardship practices and focuses on continuous improvement through pollution prevention and conservation measures. As part of EMS, the Laboratory has set or is developing specific targets to reduce various categories of energy consumption, materials use, and waste generation. The declaration of conformance was based on an internal audit and an independent audit conducted by the Livermore Site Office, which found no major nonconformances and 22 noteworthy practices. Minor nonconformances were addressed through a corrective action plan.

### Best Practices in Project Management

The Laboratory's Terascale Simulation Facility (TSF) won the DOE Secretary's Project Management Award in 2006, which is presented annually to three teams that demonstrate outstanding performance based on overall management and successful completion of a project. The \$100-million, 253,000-square-foot TSF houses two of the world's fastest supercomputers (see p. 9) and more than 250 staff members. The facility was completed in 2004, eight months ahead of schedule and \$1.2 million under budget.

TSF construction and the ongoing NIF and Engineering Technology Complex Upgrade projects benefit from the use of an Earned Value Management System. EVMS is also being used for a growing list of projects within the Stockpile Stewardship Program. This best-practices tool provides an effective means for evaluating how well a project is being



The TSF project management team celebrates their award from DOE. Project manager Anita Zenger is holding the TSF sign on the left.

executed with respect to technical requirements, cost, and schedule. EVMS gives sponsors, Laboratory managers, and those engaged in the project a clear view of status and progress. By bringing formality to project management, EVMS enhances project planning and execution, and it reinforces clear roles, responsibilities, and accountability.

In May 2006, DOE's Office of Management certified the Laboratory's EVMS. To achieve site-wide certification, Livermore had to demonstrate that the system was compliant with the 32 guidelines in the American National Standards Institute/Electronic Industries Alliance Standard 748-A. Certification is important because DOE recently began requiring that the method be used for managing earned value for capital asset projects budgeted at more than \$20 million. The University of California is the first DOE contractor to certify EVMS at all of its sites, and it is the only contractor that has site-wide certification for each site.

### Superblock Back to Normal Operations

With the approval of the NNSA Livermore Site Office, the Plutonium Facility (Building 332, also known as the Superblock) returned to normal operations in May. The Laboratory decided in January 2005 to stand down operations in the facility so that the management team could turn its full attention to safety improvements. An intense effort ensued to assess all activities, develop new tools and processes, and implement rigorous protocols for resuming work. The Superblock returned to partial operations in October 2005, with activities limited to less than 5 kilograms of plutonium.

An Operational Excellence program, begun in 2005, is increasing efficiency,



Certified fissile material handler Bill Poulos machines plutonium for an experiment in the Plutonium Facility.

### Criticality Safety Training for NNSA

Criticality safety is an essential element in training NNSA workers who handle or otherwise deal with special nuclear material. At the request of NNSA, Livermore expeditiously developed a nuclear criticality training curriculum, got it approved, and graduated the first class of students, who came from various NNSA sites. Training modules include classroom sessions on regulatory and safety issues as well as hands-on experiments in the Superblock involving fissile materials, supervised by senior Laboratory certified material handlers. Participants are also trained to deal with criticality accident scenarios.



Barbara Krögfuss of Y-12 places her gloved hand on a uranium test assembly as part of a nuclear criticality training exercise at Livermore. Certified fissile material handler Nolan Lomba (right) and Mark Lee of the Livermore Site Office look on.

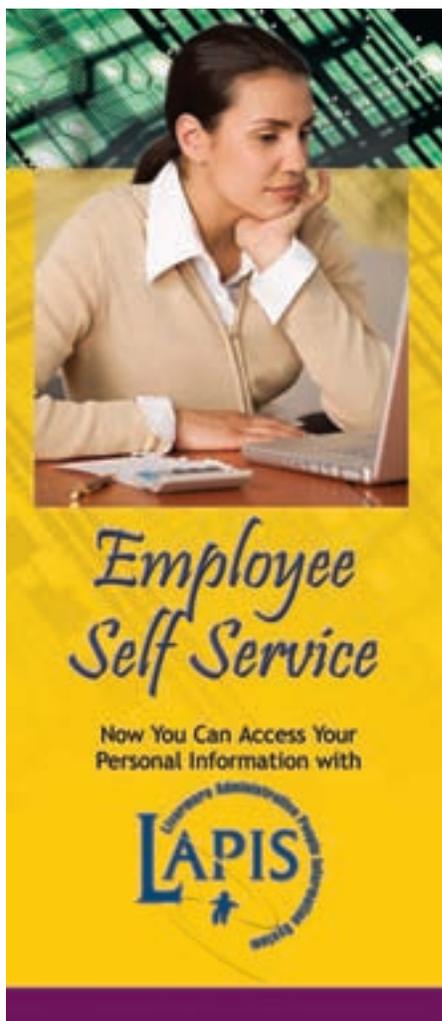
lowering costs, and increasing safety in Superblock operations. The initial effort focused on improving the Unreviewed Safety Question Determination (USQD) process for determining and documenting whether DOE approval is required for a proposed activity or whether an operation is outside of the Safety Basis. Implementation of recommended improvements has led to a 80-percent reduction in the USQD approval cycle time, better documentation, and cost avoidance by reducing the number and duration of USQD-related meetings.

### Efficient and Effective Business Practices

The Laboratory's business systems—procurement, property management, and finance—are designed to meet best-in-class business practices and applicable federal regulations. Each area has performance management programs in place that include metrics and performance thresholds, developed in concert with NNSA and UC. Business processes and systems are continuously improved to increase effectiveness and lower institutional administrative costs. Livermore is re-engineering many processes by taking advantage of information technologies. In addition, the Laboratory uses internal audits—and is subjected to external audits—to ensure that business systems are in full compliance and follow best practices.

A Process Improvement Initiative is serving as a catalyst to stimulate continual improvement. Livermore

staff members trained in process improvement methods are assisting organizations that have identified opportunities and needs for process improvement. More than 60 process improvement projects are completed or well underway, spanning every directorate at the Laboratory. Among many examples, projects are improving the processes for revisions to the



LAPIS gives employees and staff secure online access to personal data.

Laboratory's *ES&H Manual*, workflow in the Plutonium Facility, employee termination, configuration management and security of computer systems, and determination and approval of ES&H roles and responsibilities as work projects, facilities, and organizations change.

Livermore is also investing in business and financial management projects that will transform the way work is done. As an example, the multi-year Enterprise Project Accounting and Reporting (EPAR) Program aims to replace Livermore's current financial system and provide capabilities to track project costs, budgets, funding, and schedules, and perform earned value management within a single-source system. To ease the transition, EPAR is organized to be a series of releases. The first, called Financial System Upgrade, was completed in January 2007. The Financial System Upgrade entails implementation of a new project-costing module and accounting format changes.

In addition, the Laboratory's system for managing employee information, the Livermore Administrative People Information System (LAPIS), was significantly upgraded in 2006. The upgrades enhance self-service capabilities and automate the process for updating, approving, and routing modifications to personnel information. The system makes it easy for employees to view and update their personal information online and for Laboratory directorates to validate and update personnel data so that timely and accurate people information can be provided to the new Laboratory contractor.